UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,165	09/19/2003	Timothy J. Bomya	5701.00297	7103

26659 7590 01/04/2005

DINNIN & DUNN, P.C.
2701 CAMBRIDGE COURT, STE. 500
AUBURN HILLS, MI 48326

EXAMINER	
WHITTINGTON, KENNETH	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/666,165	BOMYA, TIMOTHY J.	
	Examiner	Art Unit	
	Kenneth J Whittington	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 11 is objected to because the term "that" in line 2 should be "than". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 20-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Tyren et al. (US 5,297,439). Regarding claim 20, Tyren et al. discloses a method for sensing a condition of a magnetic circuit comprising:

associating a coil (See Tyren et al. FIG. 4, item 8) with the magnetic circuit (See FIG. 4, circuit running through items 11 and 15) so that a time-varying magnetic flux in said magnetic circuit is magnetically coupled with said at least one coil (See col. 5, lines 6-16);

coupling said at least one coil to at least one electrical circuit (See col. 5, lines 6-16);

adapting said at least one electrical circuit so that an oscillation frequency of said time-varying magnetic flux is substantially at or near a resonant frequency of said at least one coil in cooperation with said at least one electrical circuit for at least one condition of said magnetic circuit (See entire disclosure of Tyren et al., particularly the resonant circuit 10 comprising coil 8 and capacitor 9 and see col. 5, line 62 to col. 6, line 2); and

sensing a condition of said magnetic circuit from a signal associated with said at least one electrical circuit responsive to said at least one coil (See col. 5, lines 17-40).

Regarding claim 21, Tyren et al. discloses coupling at least one first capacitor in series with the first coil (See FIG. 4, item 9 and col. 6, lines 10-14), and applying an oscillatory first signal in series with said at least one first coil (See col. 5, lines 6-12).

Regarding claim 22, Tyren et al. discloses sensing a signal selected from a voltage across said at least one first coil, a current through said at least one first coil, a voltage across a resistor in series with said at least one first coil, and a voltage across said at least one first capacitor (See col. 5, lines 51-55), and

comparing said signal with a threshold (See col. 4, line 61 to col. 5, line 36).

Regarding claim 23, Tyren et al. discloses sensing from said signal the operativeness of said electrical circuit including said at least one first coil (See col. 5, line 13-33).

Regarding claim 24, Tyren et al. discloses sensing a signal comprising a measure responsive to or related to an inductance of said at least one first coil (See col., 4, line 61 to col. 5, line 5), and

comparing said signal with a threshold (See col. 4, line 61 to col. 5, line 36).

Regarding claim 25, Tyren et al. discloses sensing from said signal the operativeness of said electrical circuit including said at least one first coil (See col. 5, line 13-33).

Regarding claim 26, Tyren et al. discloses varying a frequency of said oscillatory first signal and sensing a response from said at least one electrical circuit responsive to said frequency (See col. 2, lines 35-47).

Regarding claim 27, Tyren et al. discloses coupling at least one second capacitor in parallel with a second coil of said at least one coil so as to form a parallel circuit, and the operation of sensing a condition of said magnetic circuit comprises sensing a voltage across said parallel circuit

responsive to said time-varying magnetic flux in said magnetic circuit (See col. 4, lines 57-60 and col. 6, lines 3-9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-7 and 14-15, 17, 19, 29 rejected under 35 U.S.C. 103(a) as being unpatentable over Tyren et al. in view of Wetzel et al. (US 5,428,534). Regarding claim 1, Tyren et al. teaches a magnetic sensor comprising:

a coil associated with a magnetic circuit (See FIG. 4, coil item 8 and circuit running through items 11 and 15),

wherein said at least one coil is adapted to cooperate with a time-varying magnetic flux in said magnetic circuit (See col. 5, lines 6-16) and wherein said time-varying magnetic flux is generated or sensed by said at least one coil and is responsive to a condition of said vehicle body that is sensed by the magnetic sensor (See col. 4, line 61 to col. 5, line 36); and

an electrical circuit operatively coupled to said at least one coil (See FIG. 1, items 3, 6 and 7), wherein said electrical circuit cooperates with the coil so that it exhibits a resonant or near-resonant condition in association with said time-varying magnetic flux for at least one condition of said magnetic circuit (See entire disclosure of Tyren et al., particularly the resonant circuit 10 comprising coil 8 and capacitor 9 and see col. 5, line 62 to col. 6, line 2).

However, Tyren et al. does not explicitly teach the deformation sensor incorporated into a vehicle, the magnetic circuit being in the vehicle body. Wetzel et al. teaches a deformation sensor plate incorporated in or directly behind a vehicle body outer skin, particularly a door (See Wetzel et al. col. 2, lines 44-52 and FIG. 1, item 3). It would have been obvious to incorporate the deformation sensor plate as taught by

Tyren et al. into the vehicle body outer skin as taught by Wetzel et al. One having ordinary skill in the art would have been motivated to do so in view of the statement in Tyren et al. that the sensor can be applied to various objects for measurement (See Tyren et al. col. 2, lines 48-54), to measure mechanical stress, deformation and other similar magnitudes of an object for measurement (See col. 1, lines 4-6), and the statement in Wetzel et al. that its tripping device uses a known deformation sensor (See Wetzel et al. col. 4, lines 26-30).

Regarding claim 2, the combination of Tyren et al. in view of Wetzel et al. teaches the ferromagnetic plate (item 11 in FIG. 4 of Tyren et al.) incorporated into the outer skin of the vehicle door (typically constructed of a magnetically-permeable steel, See Disclosure page 2, line 6).

Regarding claims 3-5, the combination of Tyren et al. in view of Wetzel et al. teaches monitoring the sensor for nominal or normal condition at the resonant frequency and a defect condition relating to a deformation of the sensor plate (See Tyren et al. col. 4, line 61 to col. 5, line 36).

Regarding claim 6, the combination of Tyren et al. in view of Wetzel et al. teaches a first electrical circuit comprising a first coil (See FIG. 4, item 8);

a first capacitor in series with said at least one first coil (See FIG. 4, item 9 and col. 6, lines 10-14); and

an oscillator (included in the electrical unit 6 of Tyren et al. FIG. 1) that generates a first signal that is applied to said at least one first coil and a first resonant frequency of said at least one first coil in combination with said at least one first capacitor is at or near a frequency of said first signal for at least one condition of said vehicle body (See Tyren et al. col. 5, line 6 to col. 6, line 2).

Regarding claim 7, the combination of Tyren et al. in view of Wetzel et al. teaches the oscillator comprising a sinusoidal oscillator (See Tyren et al. col. 5, lines 6-12 and col. 5, line 62 to col. 6, line 2).

Regarding claim 14, the combination of Tyren et al. in view of Wetzel et al. teaches sensing a signal selected from a voltage across said at least one first coil, a current through said at least one first coil, a voltage across a resistor in series with said at least one first coil, and a voltage across said at least one first capacitor (See col. 5, lines 51-55).

Regarding claim 15, the combination of Tyren et al. in view of Wetzel et al. teaches the deformation sensor further comprising a processor, a circuit, or a combination thereof (See Tyren et al. FIG. 1) that determines a measure responsive to or

related to an inductance of said at least one first coil (See col., 4, line 61 to col. 5, line 5).

Regarding claim 17, the combination of Tyren et al. in view of Wetzel et al. teaches a second electrical circuit comprising:

a second coil and a second capacitor in parallel with said at least one second coil, wherein a second resonant frequency of said second coil in combination with said second capacitor is at or near an oscillation frequency of said time-varying magnetic flux coupled to said second coil for a condition of said vehicle body (See col. 4, lines 57-60 and col. 6, lines 3-9).

Regarding claim 19, the combination of Tyren et al. in view of Wetzel et al. teaches a second electrical circuit comprising:

a second coil and a second capacitor in parallel with said at least one second coil, wherein a second resonant frequency of said second coil in combination with said second capacitor is at or near an oscillation frequency of said time-varying magnetic flux coupled to said second coil for a condition of said vehicle body, and said second resonant frequency is substantially equal or near to said frequency of said first signal for at least one condition of said vehicle body (See col. 4, lines 57-60 and col. 6, lines 3-9).

Regarding claim 29, Tyren et al. teaches each and every limitation of claim 20 as discussed above. However, Tyren et

al. fails to teach the deformation sensor incorporated into a vehicle body. Wetzel et al. teaches a deformation sensor plate incorporated in or directly behind a vehicle body outer skin, particularly a door (See Wetzel et al. col. 2, lines 44-52 and FIG. 1, item 3), the sensor detecting a side crash on the vehicle and actuating air bags in response to the crash (See Wetzel et al. col. 4, lines 16-25). It would have been obvious to incorporate the deformation sensor plate as taught by Tyren et al. into the vehicle body outer skin as taught by Wetzel et al. One having ordinary skill in the art would have been motivated to do so in view of the statement in Tyren et al. that the sensor can be applied to various objects for measurement (See Tyren et al. col. 2, lines 48-54), to measure mechanical stress, deformation and other similar magnitudes of an object for measurement (See col. 1, lines 4-6), and the statement in Wetzel et al. that its tripping device uses a known deformation sensor (See Wetzel et al. col. 4, lines 26-30).

Claims 8, 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyren et al. in view of Wetzel et al. as applied to claims 1, 6 and 17 above, and further in view of Mirdadian et al. (US 3,835,371). Tyren et al. in view of Wetzel et al. teach each and every limitation of claims 1, 6 and 17 as

noted above. Tyren et al. further teaches of second coil circuits in conjunction with the first coil circuits (See Tyren et al. col. 4, lines 57-60 and col. 6, lines 3-9). However, this combination does not teach of alternative waveforms for use in the apparatus. Mirdadian et al. teach it is known to use either square or mono-polar wave oscillator in a LC resonant frequency transmitter (See Mirdadian et al. col. 3, lines 30-40). It would have been obvious to use such waves in the apparatus of Tyren et al. in view of Wetzel et al. because such wave are well known and conventional in art as alternatives to regular analog waves (See Mirdadian et al. col. 3, lines 30-40).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tyren et al. in view of Wetzel et al. as applied to claims 1 and above, and further in view of Withers et al. (US 5,276,398). Tyren et al. in view of Wetzel et al. teach each and every limitation of claims 1 and 6 as noted above. However, this combination does not explicitly teach modifying the capacitance of the coil. It is well known the art to modify the capacitance of a coil as noted by Withers et al. (See Withers et al. col. 1, lines 20-26). One having ordinary skill in the art would have been motivated to do so fine tune the

frequency of the coil and avoid unwanted components of a signal (See Withers et al. col. 1, lines 20-26).

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyren et al. in view of Wetzel et al. as applied to claims 1, 6 and 17 above, and further in view of Shizuya (US 5,760,577). Tyren et al. in view of Wetzel et al. teach each and every limitation of claims 1 and 6 as discussed above. However, this combination does not explicitly teach incorporating a resistance of the coil greater than one or a remainder of components. Shizuya teaches of placing a resistor in series with an LC circuit (See Shizuya FIG. 5, item 26). It would have been obvious to incorporate such a resistor into the circuit taught by Tyren et al. in view of Wetzel et al. One having ordinary skill in the art would have been motivated to do so to adjust the voltage level in the resonance circuit (See Shizuya col. 5, lines 58-61). It further would be obvious to modify the resistance of the resistor and/or coil so that the coil has a higher or lower resistance than the resistor. One having ordinary skill in the art would have been motivated to do so in view of the statements of Shizuya noted above in order to modify the voltage to a predetermined level as required by the system. Furthermore, where the general conditions of a claim

are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *See In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, modifying the resistance of the circuit, i.e., resistor, to have a resistance more or less than that of the coil would be an obvious optimization in view of the teachings of Shizuya.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tyren et al. in view of Wetzel et al. as applied to claims 1 and 6 above, and further in view of Takahashi (US 5,707,076). Tyren et al. in view of Wetzel et al. teach each and every limitation of claims 1 and 6 as discussed above. However, this combination does not explicitly teach of incorporating a second capacitor to have a pair of capacitors with the coil in series therebetween. Such an oscillator arrangement is similar to an oscillator well known in the art as a Colpitts oscillator, which is illustrated in Takahashi (See Takahashi FIG. 7). It would have been obvious to incorporate a general Colpitts oscillator design into the combination of Tyren et al. in view of Wetzel et al. such that the coil is in series between two capacitors. One having ordinary skill in the art would have been motivated to do so to tune the frequency of the coil (See Takahashi col. 4, lines 21-34).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bomya (US 6,777,927) is a prior patent to Applicant. Frazier (US 5,525,907) teaches an impulse magnetometer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (571) 272-2233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kenneth J Whittington
Examiner
Art Unit 2862

kjw

JAY PATIDAR
PRIMARY EXAMINER